



## Front Matters

### TITLE

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The purpose of submitting this report is as a partial requirement in order to complete four years of Petroleum Engineering Degree in UCSI University. Another internship/Coop is needed after completion of forth year or before the last semester of graduation. Another great reason to submit this internship report is to increase the technical writing skills in writing a technical report and to share the experience of working on real projects and summarize them in a technical report.

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### APPROVAL PAGE

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All the documents had been signed and approved by the supervisor & it is ready to be submitted to the university. In order to ensure more, an email can be sent to the supervisor of the company to check that the report had been already verified.

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### DECLARATION

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All the work that had been done in this report is original, and if there is any diagram or text from other recourses, it will be formally cited with all the reference needed.

All the figures are belongs to company, unless it will be stated otherwise with the necessary references.

### ACKNOWLEDGMENT

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All the thanks to my university supervisor Ms. Farhana who supported me, and answered most of my questions about the coop and was really patient in answering each and every question in a clear and understood language.

Many thanks to my country Yemen, and to Dome Company Limited, who did offered me a great experience in the work field. Also, a great thanks to Khaled Shaban who did complete all my documents and apply for me in the company.

Great thanks to my supervisor Mr. Habib Osama who did teach me every important thing about oil and gas industry and did expand my knowledge in oil and gas industry.

Huge thanks to the general manager Mr. Khaled Daer who dedicated his time to assist me when needed and gave me whatever was needed without any hesitation. Thanks to my parents who did support me and provide for me almost everything that was needed.

### EXECUTIVE SUMMARY

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The purpose of the report is to show all the tasks that had been done and all the experience that had been gained through the internship. Also, to explain that what had been taught in the university was applied in the work field. For duration of three months and 21 days the tasks completed were into mainly mechanical and electrical work, as well as some of AutoCAD® Software drawings and the way of reading P&IDs and identify every symbol and its function. Furthermore, the tasks in the field were more into petroleum such as designing and installing a new wellhead and X-mass tree. Also, going for a whole day to a drilling rig and performing a cement job, which gave me a great opportunity to understand the mechanism of drilling. Although, Dome Yemen was not a company that directly deal with petroleum engineering, but lots of knowledge was gained, since Dome Yemen Company is working for TOTAL Yemen E&P, which provide TOTAL Company with almost everything that deal with construction or mechanical work. Furthermore, Dome Yemen Company, also provide electrical work with help with another operator to accomplish tasks for TOTAL Yemen. Moreover, the scope of work can be divided into two types; the office work and the field work, for both of them there are some advantages and disadvantages. In the main office in Sana'a City, the advantages are that you have weekends and light work can be considered. However, the disadvantage of working in the main office can be considered as the amount of the salary that would be paid. A good advantage of working in the field is that the time table will be organized and the load of work will depends on the situation of block itself. It might feel homesick if a person is not used to it, and that could consider as a disadvantage in working in the field. Finally to sum up, this internship program is an important thing that all the students must do before graduate. From this co-op program the student who is doing a degree in engineering can see him/her self in the future and what type of work can be performed by him/her. This program gives the students the ability to think of what kind of work they really want to do. Internship in a good company is

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highly recommended so the students will expand their networks and prove themselves.

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### LIST OF ABBREVIATIONS

B/Dev: Business Development

DIR: Director

DIV: Division

DGM: Deputy General Manager

ESP: Electrical Submersible Pump

FNS: Finance and Stores

GM: General Manager

HMB: Heat & Material Balance

ICT: Information and Communication Technology

LLC: Limited Liability Corporation

MNG: Manager

PL: Purchase and Logistics

P&IDs: Pipelines & Instrument Drawings

PPE: Personal Protective Equipment

QHSE: Quality Health & Safety Environment

# Chapter 1

## Introduction

### 1.0 RATIONALE

Co-op education program is extremely important and useful for the students, companies and the university that provide this program. For the students, it is useful and important because it provides the students with the ultimate opportunity to experience the work life after graduation. For the company is useful, especially if this student is doing the Co-op in his/her major in a company with same interest, so the company will not train this particular student again after he/she graduate from the university for the same tasks. It is important for the university to have and to provide such a program to increase the world rank of the university among other universities.

#### 1.0.1 Universities that adopt CO-OP

- Clarkson University (NY)
- Colorado School of Mines
- Dartmouth College (NH)

All these universities above are from the United States of America and all of them had been applying the internship program for a long time and with good results to come out, and a huge satisfaction from the students and their spouse.

# Chapter 1

## Introduction

### 1.1 OBJECTIVES

- I. To get hands on oil and gas equipment to get enough experience in performing practical work in projects.
- II. To improve self-reliance, self-confidence and responsibility.
- III. To apply what had been taught in the university in real life and increase relevance of learning and motivation for study.

### 1.2 SCOPE AND LIMITATIONS

The scope of co-operative education was done in Sana'a City the capital of Yemen for the first two months then for the third month it was done in the site onshore in East Shabwah in Kharir Block 10, on the last 21<sup>st</sup> days remaining in the last month of the Co-op it was done back in the main office in Sana'a City.

Name of the company that the internship had been done in is Dome for Trading and Contracting Company Limited, which provide engineering services in oil and gas industry.

The location of the company is in Sana'a City, Yemen, which consider the branch of the main office in UAE. Moreover, there are other branches in Jordan and Iraq.

### 1.3 SIGNIFICANCE

The Co-op education program had great benefits for me such as, it increased my communication skill, and it helped me start writing report as technical reports. It gave me the chance to experience the work in the office and in the site and how to deal with other while performing any task.

Lots of great important experience and skills were gained from this Co-op program, beside the skills mentioned above. The skill of reading more books was gained in this program. Co-op educational program is important in order to complete an engineering degree in UCSI University, and it's really helpful to apply the knowledge that had been learnt in the university and put it into real practice.

About the rewards that were offered to me, it was monetary satisfaction as well as personal satisfaction. They haven't really paid me a salary, but they called it a transportation allowance, about the personal satisfaction, they have given me the freedom to do almost everything related to work. Plus, providing a free P.P.E In general, this Co-op program will eventually produce engineers who would become professional engineers.

## 2.0 COMPANY BACKGROUND

Dome's first office, Dome International LLC, was opened in the UAE in January 1997 and the first office in Iraq was established later the same year. Dome Oilfield Engineering & Services LLC followed in Abu Dhabi in 1998 and the first office in Yemen was established in 1999. The latest additions to the Group, Dome DZ International General Contracting LLC and Al Qubbah Engineering Co were established in 2011.

Established in the United Arab Emirates in 1997, the Dome Group is engaged in the provision of Health, Safety & Environmental Consultancy, Construction, Maintenance, Project Development and Supply of Equipment & Services to industries and organizations across the Gulf and the Middle East regions.

Dome's management team in each country is led by experienced nationals with extensive local knowledge and a deep commitment to building strong, sustainable and profitable businesses.

We believe that Dome's core strength lies in the competence, quality and dedication of its employee team. In addition, we have developed a strong network of external associates which provides ready access to a wide range of resources and expertise; as a result we are able to offer a complete and unique service.

Our objective is to support our clients and partners in the successful implementation of all stages of their projects, from inception to completion and beyond. We strive to provide them with services which not only meet, but also exceed their expectations and specifications. This attention to quality is combined with a highly efficient problem-solving approach.

## Chapter 2 Company Profile

We believe that our successful growth is testimony to the quality of our services, and we aim to continue to develop these capabilities while ensuring that our high standards are maintained.

"Dome takes pride in the diversity of its business, geographical coverage and most importantly in its multinational workforce. Through the hard work of its staff at all levels it has managed to achieve annual growth each year since its inception. It is an honor for me to lead such a Group and I look forward to be involved in the successes and challenges to come."



**Figure 1 Talal Ali Daair Al Yafei  
Founder and CEO of Dome Company.**

### 2.1 LOCATION OF THE COMPANY

Dome Trading & Contracting Company Limited

Villa #18, Street #38 (Off Hadda Road)

P.O. Box: 16187 - Sana'a, Yemen

Tel: +967 1 413 629

Fax: +967 1 413 631

#### 2.1.1 COMPANY MAP



**Figure 2 Satellite Map of Dome Company**



**Figure 3 Map View of Dome Company**



## Worldwide Offices

### ❖ United Arab Emirates

#### **Dome International LLC, Dubai**

Dome's Dubai office acts as the central organization managing and coordinating the activities of the Dome Group. It supports the Group companies in business development, strategy, finance and corporate development. It is also directly engaged in the provision of HSE consultancy, and the supply of engineering equipment and related support Services for the UAE, Iraq and Yemen.

#### **Dome Oilfield Engineering & Services LLC, Abu Dhabi**

Dome's Abu Dhabi office main focus is on provision of services to the local oil and gas, power, water, infrastructure and transport sectors. It provides HSE consultancy, supply of engineering material and related services and company representations.

#### **Dome DZ International General Contracting LLC, Abu Dhabi**

Dome DZ International General Contracting LLC was established in Abu Dhabi, UAE to provide Electrical & Instrumentation Construction and Maintenance Services to the Middle East Region. The partners have previously undertaken projects in Oil & Gas, Power and Industrial Sectors across the Region.

#### **Dome International Petroleum, Dubai**

This company specializes in Oil & Gas development, Petroleum Engineering Services, Oil products trading primarily related to the Republic of Iraq. It partners with established international oil companies. Additionally Dome has participated in contractual negotiations for field and infrastructure

## Chapter 2

### Company Profile

development in the Middle East and North African regions. Dome has performed gas market studies and commercial analysis of existing and planned gas developments In the Arabian Gulf region.

❖ Yemen

**Dome Trading and Contracting Ltd, Sana'a**

Dome Trading and Contracting Ltd, Sana'a is a leading contractor and supplier to Yemen's oil and gas, power and other industrial sectors and has implemented various Engineering, Procurement & Construction (EPC) turnkey projects for the Petroleum, Power and industrial sectors of Yemen. Major projects executed by Dome Yemen include EPC for Electrical, Instrumentation, and Mechanical works related Oil & Gas Central Processing Facilities, pipelines, flow lines, wellhead tie-in's and tank erections. It also provides maintenance services for electric generators, gas turbines, process vessels, etc and has recently executed shutdown turnaround maintenance for LNG Plant in Belhaf , Yemen.

**Dome Industrial & Engineering Services Complex Company Ltd, Aden**

Dome Industrial & Engineering Services Complex Company Ltd, a 100,000 sq ft workshop facility in Aden, was established in 2009 to provide fabrication, machine shop, machinery overhaul and valve refurbishment services. It provides maintenance support work for the Aden Port and also for maintenance activities of Dome Trading and Contracting Ltd.

❖ Iraq

**Dome Engineering Co (Al Qubba Engineering Co.), Basrah**

Dome Engineering Co (Al Qubba Engineering Co) is an Engineering & Contracting Company established in Basrah by Dome Group to carry out Construction Services, HSE Consultancy, Maintenance Activities and Supply of Equipments to the Oil & Gas and Power Companies in Iraq. It is staffed by a team of experienced and committed Iraqis with extensive knowledge of

## Chapter 2

### Company Profile

local conditions and a close working relationship with our clients.

#### **Dome Offices, Other Branches**

Dome also has branches of the following companies in Basrah and Baghdad which are engaged in supporting the activities of the Dome Group in Iraq:

- Dome Trading Agencies Co.
- Dome Petroleum Services Co.
- Dome General Contracting Co.

## 2.2 VISION & MISSION

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### OUR VISION

To be a leading Engineering, Procurement & Construction Company in the region that is responsive to customers' needs.

### MISSION STATEMENT

To consistently offer superior products & services safely and timely, to ensure customers get value for money.

## 2.3 ORGANIZATION CHART

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### Dome Yemen Functional Organization Structure

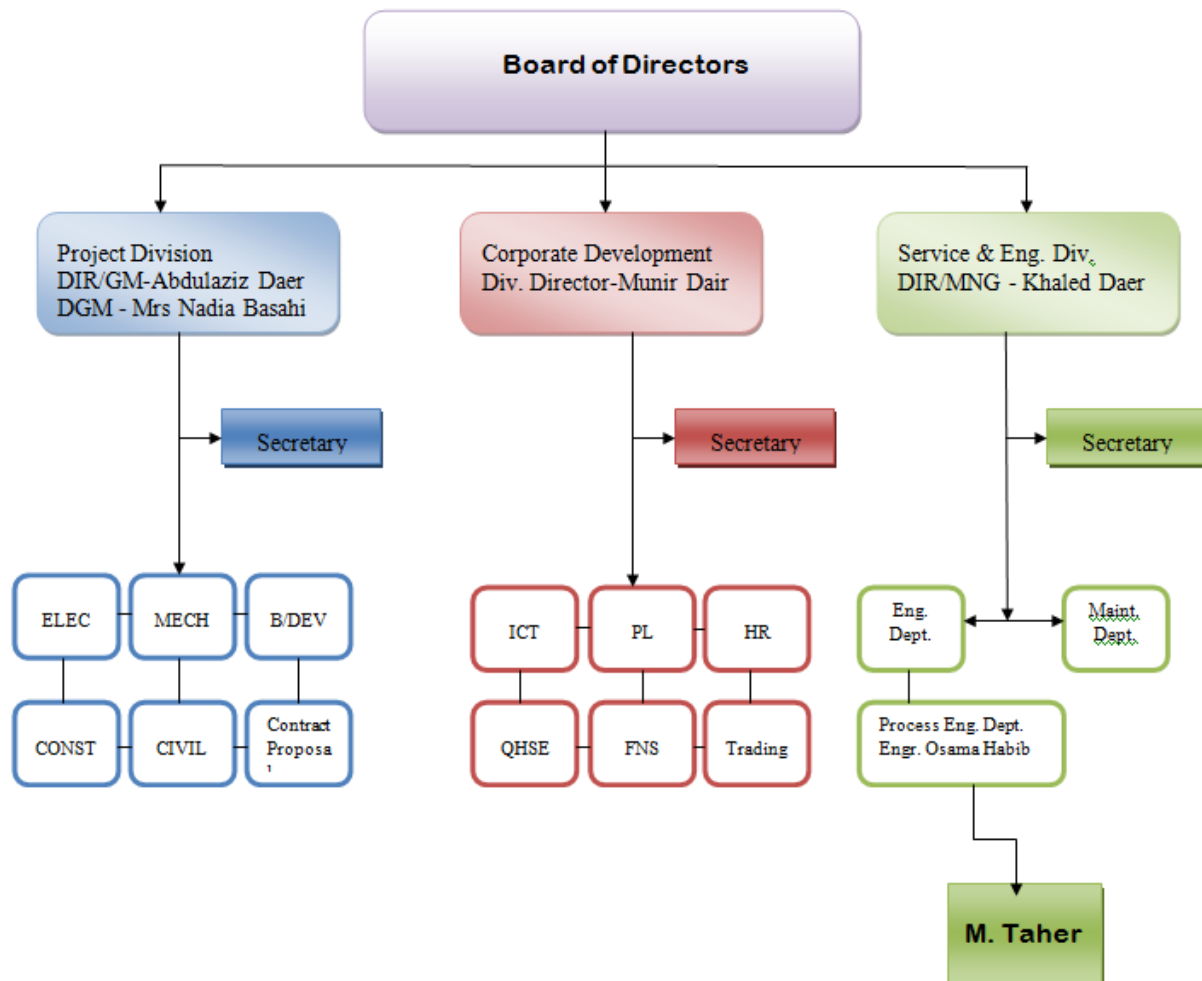


Figure 4 Organization Chart of Dome Company

## Chapter 2

### Company Profile

## 2.4 MAIN PRODUCTS AND SERVICES

Since Dome Yemen is an engineering company, then it has lot of successful projects with international companies worldwide. These projects are:

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### 2.4.1 CONSTRUCTION SERVICES:

On-going contracts within the oilfield operators.

- DOVE ENERGY Ltd.
- DNO Yemen AS.
- TOTAL E&P Yemen.
- Yemen LNG project.
- SAFER E&P Operation Co.

1. Pipeline.
2. Diesel / gas power plant.
3. Wellhead fabrication & erection.
4. Vessel piping.
5. Central processing facilities fabrication / upgrades / piping.
6. Motor / pumps civil foundation.
7. Skids and foundation for vessels.
8. Tank farm.
9. All types of electro-mechanical works.

#### 2.4.2 Services are in:

➤ **ENGINEERING SERVICES:**

1. Production oilfield facility.
2. Modification & upgrade of facility.
3. Detailed designing of crude oil & water tanks.
4. Control Room (basic & detail including PLC).
5. Plant ESD.
6. LV and HV cable sizing / power flow.
7. Instrumentation.
8. Pipeline design.
9. Structure design.

➤ **MAINTENANCE SERVICES:**

1. Provision of skilled technician for gas turbines (frame 5).
2. Gas re-injection compressors.
3. Caterpillar diesel generators.
4. Caterpillar gas engines.
5. Electrical building services contract.
6. Provision of instrument technician & engineers.
7. Cummins engines.
8. Mitsubishi Heavy Industry Engines.



### 2.4.3 Trading Services

➤ SUPPLY SERVICES:

1. Supply of special oil equipment.
2. Supply of industries electrical equipments.
3. Supply of various types of valves.
4. Import & export services.

Dome is also a leading supplier to oil and gas, power and industrial sectors and has supplied a variety of materials and equipment including electrical materials, generators and transformers, chemical injection systems, pipes and valves, agencies representative for various oilfield products.

## Chapter 3

### Tasks Duties and Responsibilities

#### 3.0 ROLES AND RESPONSIBILITIES

The department that was assigned to work in was processing engineering department, under the supervision of a process engineer named Eng. Osama Habib. The role that was played in Dome Company was to read the P&IDs symbols and design the process of a pipeline. Moreover, to know how to build a new projects from the scratch. For example, Nebrajah Project which consider as an old projects, but all the documents had been taught and all the steps needed to create a new project.

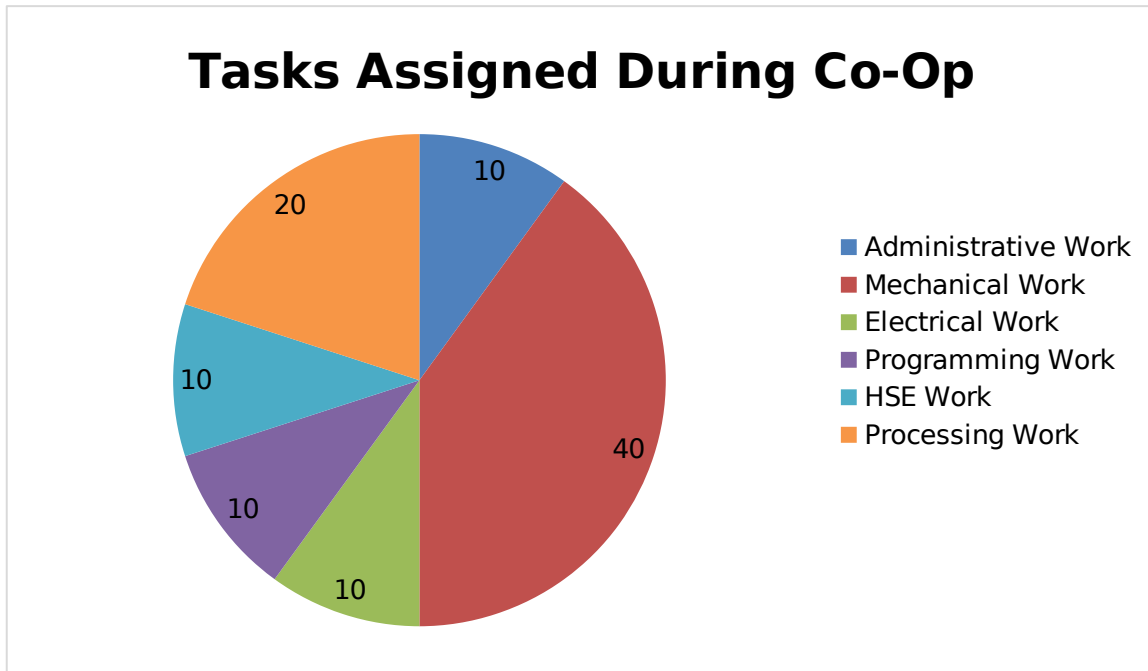
The departments was attached in were, processing engineering department, mechanical department, electrical department & drilling engineering department. Most of the tasks of the process engineering department were in the main office, the other three were in the field.

The director manager expected me to graduate and come back to work in Dome Company or at least consider the option of working with them. Although, they are not really in the depth of my major as the general manager said, but he confirmed to have me working in Dome Company after graduation.

#### 3.1 TASKS ASSIGNED

Most of the tasks assigned were on processing engineering and mechanical work in general.

In processing engineering, the task was to be able to read and draw and identify P&IDs. Also, to be able to calculate Heat & Material Balance Equations and to be able to read the flow sheet from Hysys Software® and to read the Plot Plans and Process Flow Diagrams which show an overview of the whole project. In the site, the tasks assigned to me were more into mechanical work and how to check the flow meter of the pipelines, also to know all types of valves and flanged used in the pipe and how to install the wellheads and the X-mass tree.



**Figure 5 Tasks Assigned**

The nature of the job was assigned can be divided into two ways, the first way was in the main branch office in Sana'a City, Yemen and the other one was in the field in East of Shabwah, Yemen. Most of the office work was an administrative work & processing engineering work, plus really valuable information about what is being done by Dome Company in the field and all the services provided to TOTAL, since the block was owned by TOTAL Company. Beside the administrative work, there were some Health & Safety Environmental advices and programs, knowing how to read P&IDs, using AutoCAD 2013®, and getting involved in a real project that will be constructed by the beginning of the 2013.

## Chapter 3

### Tasks Duties and Responsibilities

In the field, the work had been changed from administrative work to mechanical, electrical, and most important petroleum work was drilling engineer and mud engineer. Since petroleum engineering can be divided into three majors, which they are:

- 1) Drilling Engineering
- 2) Reservoir Engineering
- 3) Production Engineering

Most of the tasks in the field by Dome Company were in production engineering such as, installing a well head, installing a substation to provide enough electricity for the ESP pumps to bring up all the oil from the well, do some maintenance for pipelines and any task related to production engineering work. HSE work was assigned to me in the site, to know all the procedure before perform any task. The electrical work was a whole separated project in the site, and it was about installing substations to the wellhead to lift up the oil, instead of using diesel generators and pollute the environment. Some programming work was performed that related to some software that was being using in oil and gas industry.

#### 3.1.1 DOME TRAINING SCHEDULE

S/ No.	Task	Start Date	Finish Date
<b>1</b>	<b>Orientation on Dome Org. and Activities</b>	<b>01/09/2012</b>	<b>03/09/2012</b>
<b>2</b>	<b>Overview on Engineering Dep. Activities</b>	<b>04/09/2012</b>	<b>10/10/2012</b>
<b>3</b>	<b>Engineering Department</b>	<b>05/09/2012</b>	<b>21/10/2012</b>
A	Legend and Symbols	05/09/2012	05/09/2012
B	Process Flow Diagram (PFD)	05/09/2012	05/09/2012
C	Piping and Instrument Diagram (P&IDs)	08/09/2012	12/09/2012
D	Types of Instruments Used and Data Sheets	16/09/2012	22/09/2012
E	AutoCAD 2013 Mechanical 2D	24/09/2012	27/09/2012
F	3D Modeling Brief	29/09/2012	02/10/2012
G	Process Simulation (Hysys Flow Sheets)	03/10/2012	06/10/2012
H	Heat & Material Balance	07/10/2012	10/10/2012
	<b>Eid Holidays</b>	<b>25/10/2012</b>	<b>02/11/2012</b>
<b>4</b>	<b>Practical Task No.1</b>	<b>13/10/2012</b>	<b>16/10/2012</b>
<b>5</b>	<b>Evaluation No.1</b>	<b>20/10/2012</b>	<b>21/10/2012</b>
<b>6</b>	<b>Projects Department</b>	<b>22/10/2012</b>	<b>10/11/2012</b>
A	Role of a Mechanical Engineer	22/10/2012	22/10/2012
B	Planning for a Project	23/10/2012	24/12/2012
C	Quoting for a Project	31/10/2012	31/12/2012

## Chapter 3

### Tasks Duties and Responsibilities

D	Project Implementation	03/11/2012	03/11/2012
E	Safety and Risk Factors	04/11/2012	04/11/2012
<b>7</b>	<b>Practical Task No.2</b>	<b>05/11/201</b>	<b>06/11/201</b>
<b>8</b>	<b>Evaluation No.2</b>	<b>07/11/201</b>	<b>10/11/201</b>
<b>9</b>	<b>Site Visit</b>	<b>11/11/201</b>	<b>19/12/201</b>
A	Maintenance Activities	11/11/2012	12/11/2012
B	Safety Induction by TOTAL	12/11/2012	13/11/2012
C	A visit to the CPU & BPU	13/11/2012	17/11/2012
D	A visit to a Well Head and X-Mass Tree	17/11/2012	25/11/2012
E	Role of a Mud Engineer	25/11/2012	30/11/2012
F	A visit to a Drilling Rig	01/12/2012	17/12/2012
G	An overview about Well Sub Stationed (WSS)	19/12/2012	19/12/2012
<b>10</b>	<b>Final Evaluation</b>	<b>05/12/201</b>	<b>24/12/201</b>

**Table 1 Dome Training Schedule**

### 3.2 TASKS COMPLETED

- 1) Analyzing the plot plans for these projects : Nabrajah, Godah, Tasour & Kharir
- 2) Lessons in AutoCAD 2013 about how to create P&IDs
- 3) Calculation of Mass Balance Equations
- 4) Getting to know about the outcomes of Hysys Simulation Software
- 5) Calculation of Heat & Material Balance
- 6) Wellhead designing & installing KHA1-73
- 7) To know all types of valves and flanges used in the pipelines and wellhead.
- 8) Drilling & Cementing Job
- 9) Shutdown and Maintenance
- 10) HSE work
- 11) Confined Space Maintenance

More details on the tasks completed:

## Chapter 3

### Tasks Duties and Responsibilities

- 1) All the names in point number one for the projects that were constructed by Dome, unfortunately the plot plans of the projects cannot be attached to this report due to the privacy of the company. In this task, analyzing how the projects were constructed and established from the scratch and all the necessary work that should be done to start a new project.
- 2) For task number 3,4 & 5 all are similar to each other and in the logbook there are huge explanations in details about each one of them.
- 3) For the wellhead designing documents can't be acquired, but some pictures will show the pipelines of the wellhead KHA1-73. In the topographic map in appendix 1, the reader can see the location of KHA 1-70 which is almost nearby KHA 1-73 that was installed by Dome
- 4) Here some of the P&IDs that had been used to in AutoCAD drawings

P&ID Line Type	Description	Symbols	Equipment (Block Name)	Symbols	Description Control Valves (Block Name)	Symbols	Description Valves (Block Name)
————	EQUIPMENT LINE		COMPRESSOR (G\$COMP)		CONTROL VALVE (G\$CV)	FLANGED	(G\$VGA) GATE VALVE (G\$VGAS)
————	MAIN PROCESS LINE		HEAT EXCHANGER TWO PASS TUBE (G\$HEX2)		SELF CONTAINED PRESSURE REGULATOR (G\$PCV)	FLANGED	(G\$VGL) GLOBE VALVE (G\$VGLS)
————	UTILITY LINE		HEAT EXCHANGER ONE PASS TUBE (G\$HEX)		BACK PRESSURE REGULATOR (G\$PCV1)	FLANGED	(G\$VPLUG) PLUG VALVE (G\$VPLUGS)
— — — —	UNDERGROUND LINE		PIG LAUNCHER/RECEIVER (G\$PIGL)		MOTOR OPERATED VALVE (G\$MOV)	FLANGED	BUTTERFLY VALVE (G\$VBF)
— . . . —	VENDOR LIMIT		VESSEL (G\$VES)		CYLINDER TYPE ACTUATED VALVE (G\$HPCV)	FLANGED	(G\$VCH) CHECK VALVE (G\$VCHS)
— — — —	MATCH LINE		TANK (G\$TANK)		HAND CONTROL VALVE (WITHOUT MOTOR) (G\$HCV)	FLANGED	(G\$VCH1) CHECK VALVE (G\$VCHS1)
=====	TRACE EXISTING LINE		FIRE HEATER (G\$FHEATER)		CONTROL VALVE WITH POSITIONER (G\$CVP)	FLANGED	(G\$VDIA) DIAPHRAM VALVE (G\$VDIAS)
— — — —	PNEUMATIC LINE		VESSEL WITH BOOT (VBOT.RAT)		ROTARY CONTROL VALVE (G\$RCV)	FLANGED	(G\$VGAP) GATE VALVE PARALLEL SLIDE (G\$VGAPS)
— — — —	ELECTROMAGNETIC OR SONIC LINE		RECIPROCATING PUMP (G\$RPUMP)		FLOAT VALVE (G\$CVLOT)	FLANGED	ANGLE VALVE (G\$VANG)
— — — —	HYDRAULIC LINE		PLATE EXCHANGER (G\$PLEX)		BUTTERFLY CONTROL VALVE (G\$SCV)	FLANGED	ANGLE VALVE (G\$VANG1)
— x — x —	CAPILLARY LINE		COALESCER (G\$COA)		WING VALVE (G\$WING)	FLANGED	THREE WAY VALVE (G\$VTWV)
————	INSTRUMENT LINK LINE		MOTOR (G\$M)		VALVE WITH FAIL CLOSE (FC) ACTION (G\$FCVA)	SCREWED	NEEDLE VALVE (G\$VNES)
— — — —	INSTRUMENT SIGNAL LINE		FLOATING ROOF TANK (G\$FRTANK)		VALVE WITH FAIL OPEN (FO) ACTION (G\$FOVA)	FLANGED	(G\$VCHOK) CHOKE VALVE FIXED (G\$VCHOK1)

Figure 6 Processing & Instrument Drawings

## Chapter 3

### Tasks Duties and Responsibilities

5) Identifying the types of valves and flanges used in wellhead and pipelines.  
Normally the common valves used are:

- I. Control Valve
- II. Check Valve
- III. Ball Valve
- IV. Gate Valve
- V. Globe Valve

**Control Valves:** are valves used to control conditions such as flow, pressure, temperature, and liquid level by fully or partially opening or closing in response to signals received from controllers that compare a "set point" to a "process variable" whose value is provided by sensors that monitor changes in such conditions.



**Figure 7 Control Valve**

**Check Valves:** is a mechanical device, a valve, which normally allows fluid (liquid or gas) to flow through it in only one direction.

**Ball Valves:** is a valve with a spherical disc, the part of the valve which controls the flow through it. The sphere has a hole, or port, through the middle so that when the port is in line with both ends of the valve, flow will occur. When the valve is closed, the hole is perpendicular to the ends of the valve, and flow is blocked. The handle or lever will be in



**Figure 8 Ball Valve**

## Chapter 3

### Tasks Duties and Responsibilities

line with the port position letting you "see" the valve's position. The ball valve, along with the butterfly valve and plug valve, are part of the family of quarter turn valves.

**Gate Valves:** is a valve that opens by lifting a round or rectangular gate/wedge out of the path of the fluid. The distinct feature of a gate valve is the sealing surfaces between the gate and seats are planar, so gate valves are often used when a straight-line flow of fluid and minimum restriction is desired.



Figure 9 Globe Valve

**Globe Valves:** is a type of valve used for regulating flow in a pipeline, consisting of a movable disk-type element and a stationary ring seat in a generally spherical body.

### 6) Drilling & Cement Job

Before visiting the drilling rig, some drilling program data for KHA1-70 Horizontal Well had been read, and it was really useful and helpful to understand the process and the procedure that should be done before initiating the drilling of a well.

A contact was made between me and some engineers who are working in TOTAL in a drilling rig as Engineer Omar Daer, who did introduce me to Engineer Nashwan whom working as a mud engineer and a supervisor for rig #4 and two other rigs.

Finally permission was obtained to visit the drilling rig, but the problem was that no one informed the company man about this visit, so when we met him he was surprised, but eventually he welcomed us.

Drilling rig #4 is using a Top Drive rather than a Kelly which consider as a new technology, the depth

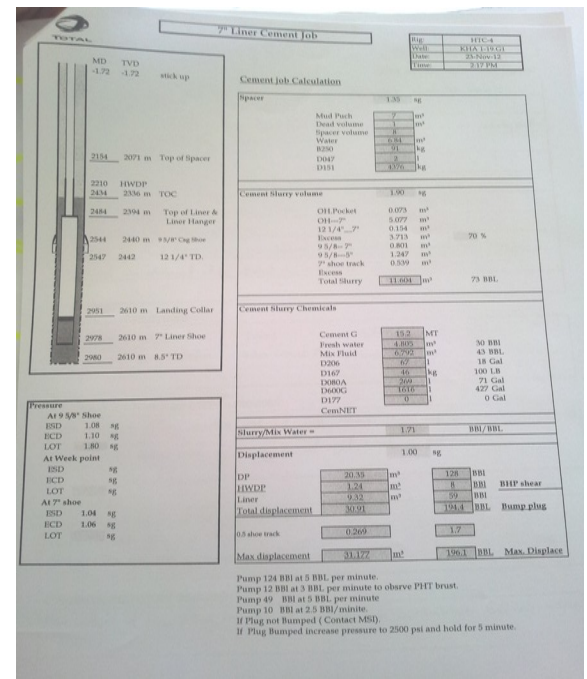


Figure 10 Cement Job



## Chapter 3

### Tasks Duties and Responsibilities

of the well that was being drilled by the drilling rig no.4 was 2885m, and it was being drilled for 56 days so far. The Pay Zone normally is the Basement Layer. The cement type that they are using is class G.

The well name is KHA1-19 G, which was a water injection well, then it became to oil producing well.

A safety induction had been done upon the arrival to the site and then an HSE officer guided us to the rig floor, after that another engineer came and start explaining in details about what is going in details in the drilling rig, and he did answer most of our questions.

Engineer Omar Daer didn't get the chance to come and explain for us (us here referring to myself and another trainee from TOTAL) in the morning, but he came later in the afternoon with the mud engineer and explained to us topics related to drilling operations.

The mud engineer Nashwan although he was a mud engineer he had a 10 years experience and he was also the supervisor of three drilling rigs, he did explain very well and in details about the cement job and what procedure should be taken before and after cementing. Also, he gave us some calculations about cement volume that should be pumped to the hole.

After that, we visited the international companies and started to ask them about their role in the drilling rig.

TOTAL: a company man must be there as a representative of TOTAL and his role to supervise and make sure that work is going on schedule.

HTC who owned the drilling rig, and provided the manpower to run the rig, the rig is being rented to TOTAL with \$35,000 per day.

Schlumberger is providing the rig with all necessary cement slurry; and on the date of the visit there was a cement job.

Halliburton was the one responsible for the drilling fluid as drilling mud.

Weatherford is into the drilling liners and tools of drilling.

## Chapter 3

### Tasks Duties and Responsibilities

Baker Hughes, they do have sensors all over the rig and they do mud & well logging.

An engineer from Schlumberger did explain to us the type of cement they are using and how they mix it, and what kind of chemicals can be added to reduce the thickening time of the cement as accelerators or retarders to increase the thickening time of the cement

An engineer for Halliburton explained to us how they used two type of drilling fluid as aerated liquid for the first few layers of drilling, then they have used WBM (Water Based Mud) they haven't used OBM (Oil Based Mud) due to the environmental problems that is cause and due to TOTAL regulations.

For Weatherford an engineer from them explained for us how they put down the liners and the other type of liner that had already had holes in it, which there will be no perforations actions necessary.

In Baker Hughes, we did go to their caravan in the rig site which it can be called as Well/Mud Logging Unit. In the Mud Logging Unit I have seen:

- Chromatograph
- Core plugging apparatus
- Fluoroscope
- Microscope
- Vacuum oven
- Gas analyzer
- Mud logs



Figure 11 Well Logging Data

An engineer from Baker Hughes, explained briefly about how to use these equipments above.

A meeting with a process engineer named Basheer AL-Yousifi from TOTAL was held, to discuss the processes occurring in the surface facilities in Kharir site.

## Chapter 3

### Tasks Duties and Responsibilities

7) The shutdown was proposed to be on 17/11/12 but, it was postponed for 2 more weeks. After taking a PTW, a visit to Atuf CPU for the shutdown had been done. While the shutdown is on, the maintenance team started working on cleaning one of the separators. In the shutdown process the maintenance team did use a pig brush and launch it from a pig launcher and then in the other side of the pipeline there is a pig receiver to receive the pig brush. The use of a pig trap is to clean the pipelines from any wax or any other participated substance in the pipe. On that day of shutdown the work started a little bit early at 04:30 the engineers had left the camp and they have reached there after one hour.



**Figure 12 SLB Separator**

8) In HSE Department, HSE officer must be present in any work being done by engineers or workers to make sure that everyone is following the rules about safety and to perform the work in a safe environment. A visit to TOTAL main office had been done, to submit some documents. And on the way back one of the JCB excavators that belongs to Dome, was stopped on the side of the road, due to a mechanical error that led to an oil spill that contaminated the soil beneath it, so some workers have been sent to help the driver to fix this error, but since the driver knows his JCB excavator very well, he did manage to know the error and fix it up.



**Figure 13 HSE Work**

## Chapter 3

### Tasks Duties and Responsibilities

The two other works came to take out the contaminated soil into three plastic bags. Although, the contaminated soil wasn't that big, but the environmental regulations applied everywhere in the site, so we had brought all the plastic bags to location called B-07 which is the wastage area.

- 9) A 3rd party company comes every 6 months to do a safety inspection. Every 6 months the color change. It was yellow color as figure 5 indicates. The general statistics sign is compulsory to be in the front gate of each camp. Plus, the phone number of the site manager and the HSE officer.



Figure 14 General Statistics Sign

- 10) With the material coordinator, lots types of valves had shown in order to get the function of each one of them. The most common being used are ball valve, gate valve, and check valve. Then an explanation had been done about flanges and its types. Then, he showed me the pig brushes and pig foam. After that, a visit to TOTAL main office had been done to the store to show all types of valves and flanges that they do use, and showed how the old and the new pig traps looks like .



Figure 15 Pig Brushes & Foams

## Chapter 3

### Tasks Duties and Responsibilities

Chapter 3  
Tasks Duties and Responsibilities  
GANTT CHART

Weeks	0 1 - 0 9	0 3 - 0 9	0 4 - 0 9	1 0 - 1 0	0 5 - 0 9	2 1 - 1 0	1 3 - 1 0	1 6 - 1 0	2 0 - 1 0	2 1 - 1 0	2 2 - 1 0	1 0 - 1 1	0 5 - 1 1	0 6 - 1 1	0 7 - 1 1	1 0 - 1 1	1 1 - 1 1	1 9 - 1 2	0 5 - 1 2	2 4 - 1 2
Tasks																				
Orientation on Dome Org. and Activities																				
Overview on Engineering Dep. Activities																				
Engineering Department																				
Practical Task No.1																				
Evaluation No.1																				
Projects Departme nt																				
Practical Task No.2																				
Evaluation No.2																				
Site Visit																				
Final Evaluation																				

Table 2 Gantt Chart of Tasks

### 3.3 IDENTIFICATION OF PROBLEMS AND SOLUTIONS

In this section the problem and the solution had been written in a point form.

- 1) Pipe corrosion was one of the major problems that facing Dome Company, one of the solutions that was purposed and applied was installing a pig traps which do consist of a pig launcher and a pig receiver which will remove all the wax and other substances stuck in the pipes. Also, the pipe can be examined by X-Rays to check whether it is corroded or not.
- 2) Lost of circulation due to increase of hydrostatic pressure more than formation pressure and there are normally two types to solve this problem, one of them by minimizing the hydrostatic pressure by increasing the mud weight or by maintain the minimum annular velocity.
- 3) Cementing job on a drilling rig took more time to be displaced, to solve this issue an accelerator was added to the cement.
- 4) When the packer or tail pipe becomes stuck, a hydraulic jar is used to provide an upward moving shock.
- 5) Data loss while shut-in valves, readout in real time improve data quality and reduce the number of lost date.
- 6) Electricity problem in Yemen overall, to overcome this problem a solution was purposed by Dome Company to install Wind Turbine, but the government rejected the proposal.
- 7) Filling the HMB without any equation was an issue, lots of research made in order to find the right equation. Although the HMB Table that was given was for training purposes only.
- 8) Identifying the amount of oil and water in each stream was a problem, then after reading Hysys Flow Sheets and applying Mass Balance Equation the problem was solved.

## Chapter 3

### Tasks Duties and Responsibilities

- 9) Some mechanical tools was not available on time of the task, in order to perform the job, lending tools from other companies was the solution.
- 10) An error was occurred in ordering one of the equipment which put the work on hold, till the equipment had arrived.
- 11) Cost problem, a cost of running a well test is expensive, so one or two tests will be run in order to reduce the cost



## Chapter 4

### Conclusion and Recommendations

#### 4.0 CONCLUSION

To sum up the internship in Dome Company, it was divided into two types of training; office training was dealt with all the petroleum, chemical, mechanical work including processing engineering. The other type, was heading to the field to apply whatever was taught in the office and to get hands on the tools of oil and gas. Lots of knowledge had been gained throughout the three months and 21 days. Adapting to the work environment was one of the useful skills that had been learnt, increasing the communication skills and leadership skills enhanced by doing the co-op especially in the field. Apply what had been taught in petroleum course in real projects in the field was very useful. The amount of information that was gained from my supervisor was really important and deep in oil and gas industry. In the field, getting in touch with big international companies such as, Halliburton, Schlumberger, Baker Hughes, & Weatherford gave me a great experience in type of work that is being done by each one of these companies. Moreover, each one of these companies had a role in the oil rig. Schlumberger is providing the rig with all necessary cement slurry; and on the date of the visit there was a cement job. Halliburton was the one responsible for the drilling fluid as drilling mud. Weatherford is into the drilling liners and tools of drilling. Baker Hughes, they do have sensors all over the rig and they do mud & well logging. They all work together hand by hand to complete the job with zero error.

#### 4.1 Recommendations

Doing an internship is a must for every student in any university to improve the student level of thinking and the way of treating things, and to create a world full of responsible engineers.

## Chapter 4

### Conclusion and Recommendations

#### 4.1.1 Recommendation for the Company

1. Each company that offers co-op for students should have a training program for the students. Although, Dome Company didn't have one for petroleum engineers, but they did create one to fulfill the co-op requirement.
2. An increase in the allowance for the trainee should be increased, in order to motivate the students to work more efficiently.
3. Different department should be introduced to the trainee to have a complete idea about the type of work that each department do.
4. An intensive personal training is optional to the trainee who is willing to work again in the company; in this case it will benefit the company to offer a personal training to the trainee.
5. To offer to the trainee the type of work that the company does offer, so any misunderstanding will be cleared.

#### 4.1.2 Recommendation for the University

1. The university should help the student to find a company from the beginning of the semester not in the last minute.
2. The university should contact the companies that the students are doing the co-op in it, to confirm whether they really do it or just faking it up.
3. The university should give a presentation for students about what will the trainee will possible face during the co-op.
4. The university should not change or ask for more documents to be signed in the last minute.

## Chapter 4

### Conclusion and Recommendations

5. The university should make a conference with the help of any club such as SPE or iChem in order to see how the students got benefits from doing the co-op.
6. During filling the logbook the university should mainly concern about the weekly summary, due to some of the tasks that take more than one day. Instead of the daily activities.

#### 4.1.3 Recommendation for Future Candidate

1. The future candidate should have a computer skills, communication skills, and leadership skills in order to undergo his or her co-op education at Dome Company.
2. It is very important to be creative and discuss topics and provide solution and ideas whenever it is necessary.
3. It is very important to know when to say no, whenever there is a decision to be made.
4. It is highly recommend to have a clear goal to be achieved.
5. It is highly recommended if possible the second coop to be taken after finishing most of 4th year subjects.

The coop/internship program is really useful and very helpful to develop a student from being just a student to be an engineer

## Back Matters

### REFERENCES

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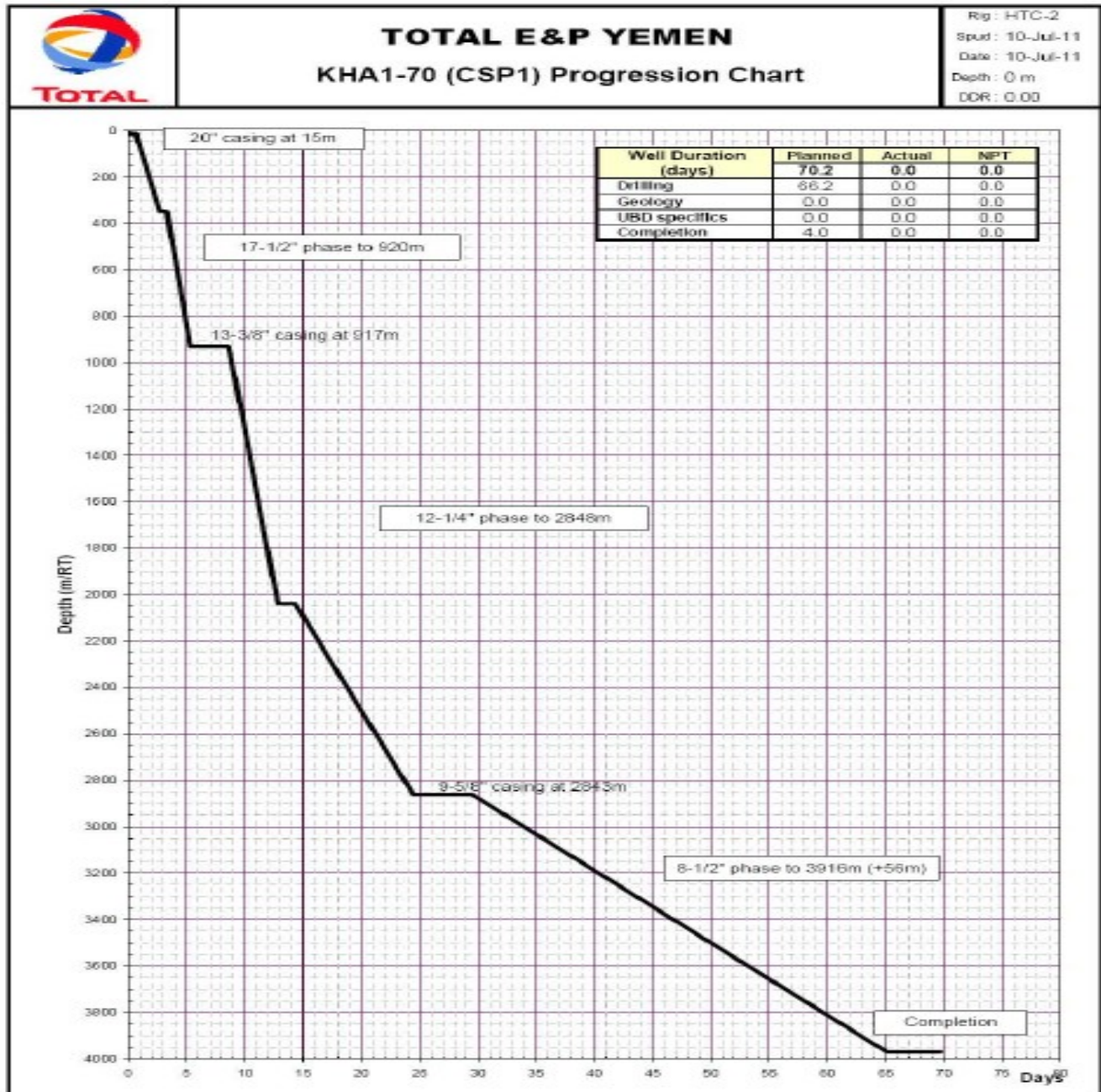
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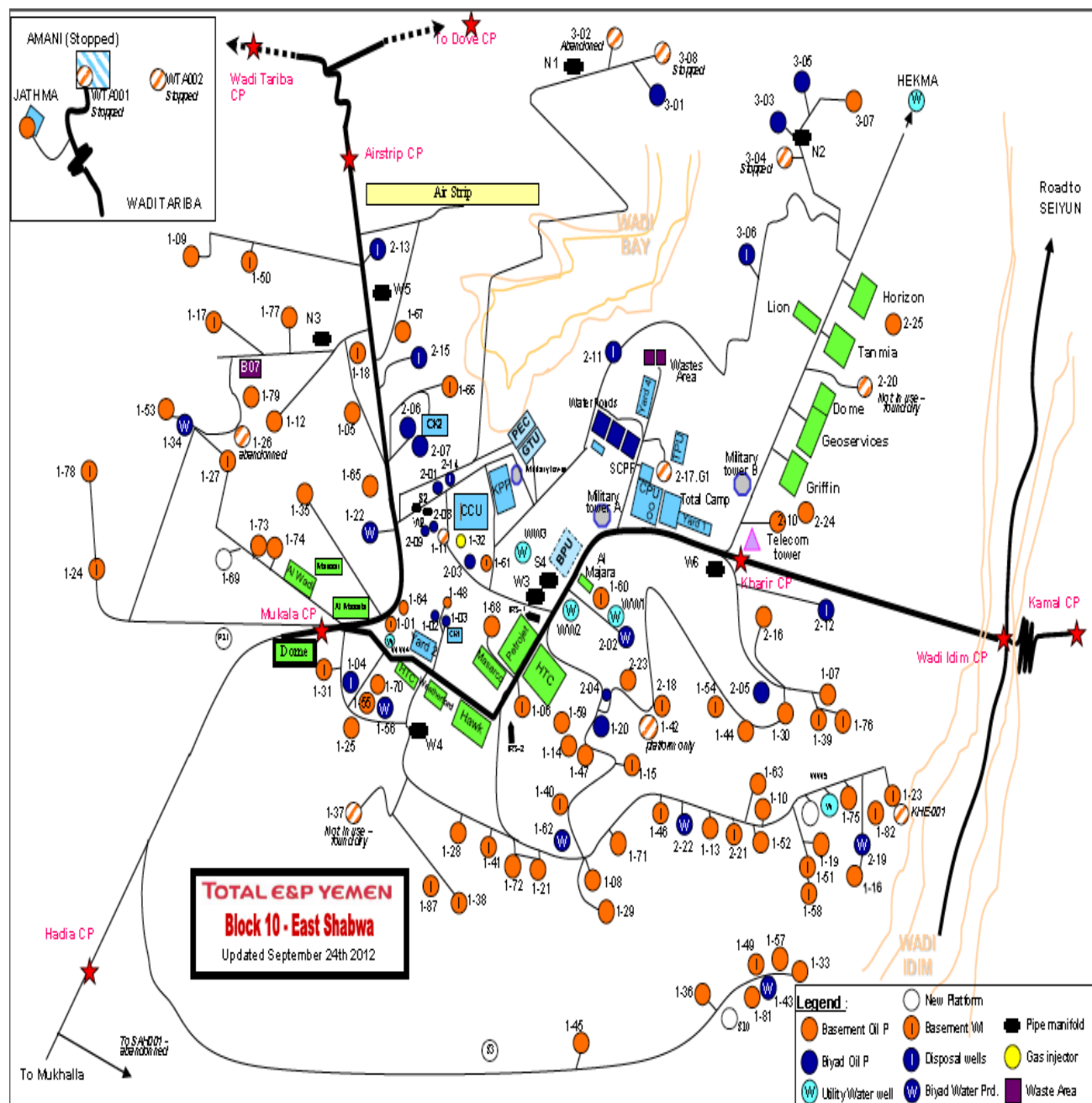
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# APPENDICES



In the figure above it shows the horizontal drilling for well KHA1-70

## Back Matters



Map of the Block 10 Kharir, including names of all water and oil wells. And other information.